510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE

A. 510(k) Number:

k120681

B. Purpose for Submission:

Addition of another anticoagulant (sodium fluoride/potassium oxalate) as a sample type

C. Measurand:

Glucose

D. Type of Test:

Quantitative enzymatic test

E. Applicant:

Siemens Healthcare Diagnostics Inc.

F. Proprietary and Established Names:

ADVIA Chemistry Glucose Hexokinase (GLUH_3) Reagent

G. Regulatory Information:

Product Code	Classification	Regulation Section	Panel
CFR – Hexokinase, Glucose	Class II	21 CFR 862.1345 Glucose test system	75

H. Intended Use:

1. Intended use(s):

   See indications for use below.

2. Indication(s) for use:

   For in vitro diagnostic use in the quantitative determination of glucose in human

serum, plasma, urine, and cerebrospinal fluid (CSF) on the ADVIA 1650 Chemistry System. Such measurements are used in the diagnosis and treatment of carbohydrate metabolism disorders including diabetes mellitus, neonatal hypoglycemia, idiopathic hypoglycemia, and insulin overdose.

3. Special conditions for use statement(s):

   For in vitro diagnostic use only. For prescription use only.

4. Special instrument requirements:

   ADVIA 1650 Chemistry System

I. Device Description:

The ADVIA Chemistry Glucose Hexokinase_3 (GLUH_3) device consists of two component reagents. Reagent 1 contains buffer, ATP, and NAD. Reagent 2 contains glucose-6-phosphate dehydrogenase, hexokinase, buffer, ATP, and NAD. Reagents are ready to use and require no additional preparation. Reagents 1 and 2 contain sodium azide.

J. Substantial Equivalence Information:

1. Predicate device name(s):

ADVIA Chemistry GLUH_3 reagent

2. Predicate 510(k) number(s):

k101854

3. Comparison with predicate:

Reagent Similarities and Differences		
Item	Candidate device: ADVIA Chemistry GLUH_3 Reagent	Predicate Device: ADVIA Chemistry GLUH_3 Reagent
Intended Use and indications for use	For in vitro diagnostic use in the quantitative determination of glucose in human serum, plasma, urine and CSF on the ADVIA Chemistry systems. Such measurements are used in the diagnosis and treatment of carbohydrate metabolism disorders including diabetes mellitus, neonatal	Same

	hypoglycemia, idiopathic hypoglycemia, and insulin overdose.	
Sample type	Serum, Urine, CSF, plasma (lithium heparin, potassium EDTA, and sodium fluoride/potassium oxalate)	Serum, Urine, CSF, plasma (lithium heparin, and potassium EDTA)
Reagent storage	2 – 8 ^{0}C	Same
Test Methodology	Enzymatic method based on use of hexokinase and glucose-6-phosphate dehydrogenase enzymes.	Same
Measurement Range	4-700 mg/dL	Same

K. Standard/Guidance Document Referenced (if applicable):

None were referenced.

L. Test Principle:

This enzymatic method is based on the method by Slein using hexokinase and glucose-6-phosphate dehydrogenase enzymes. The ADVIA Chemistry Glucose Hexokinase_3 (GLUH_3) method is a two-component reagent. Sample is added to Reagent 1, which contains the buffer, ATP, and NAD. Absorbance readings of the sample in Reagent 1 are taken and are used to correct for interfering substances in the sample. Reagent 2 is added, which initiates the reaction. Glucose is phosphorylated by adenosine triphosphate (ATP) in the presence of hexokinase. The glucose-6-phosphate that forms is oxidized in the presence of glucose-6-phosphate dehydrogenase causing the reduction of NAD to NADH. The absorbance of NADH is measured as an endpoint reaction at 340/410 nm. The difference between the absorbance in Reagent 1 and Reagent 2 is proportional to the glucose concentration.

M. Performance Characteristics (if/when applicable):

The ADVIA Chemistry Glucose Hexokinase (GLUH_3) Reagent was previously 510(k) cleared under k101854. The only change to the device in the current submission is the addition of an additional anticoagulant, sodium fluoride/potassium oxalate. Additional testing was performed and submitted to demonstrate that the performance of sodium fluoride/potassium oxalate samples is substantially equivalent to the originally cleared device. All other performance data was previously reviewed under 510(k) number k101854, which is referenced below.

1. <u>Analytical performance:</u>

   a. Precision/Reproducibility:

Previously cleared, see k101854

b. Linearity/assay reportable range:

Previously cleared, see k101854

The claimed measuring range of the device is from 4-700 mg/dL.

c. Traceability, Stability, Expected values (controls, calibrators, or methods):

Previously cleared, see k101854

d. Detection limit:

Previously cleared, see k101854

e. Analytical specificity:

Previously cleared, see k101854

f. Assay cut-off:

Previously cleared, see k101854

2. Comparison studies:

a. Method comparison with predicate device:

Previously cleared, see k101854

b. Matrix comparison:

Eighty two matched serum plasma sample sets were compared with the device. Serum and plasma sample sets were each collected from the same patient. The plasma was collected in the anticoagulant being evaluated. The samples consisted of 56 unaltered patient samples and 26 samples that were either spiked with glucose or diluted in order to cover the complete measuring range of the device. Samples ranged in concentration from 5 – 691 mg/dL. Each sample was measured n=1 on the Siemens ADVIA 1650 Chemistry System. Linear regression was performed with the following results: $y = 1.011x + 0.78$ with $r=0.999$. The 95% confidence intervals were 1.003 – 1.019 for the slope and -1.18 to 2.73 for the y-intercept.

Urine and CSF samples are not derived from whole blood and are not directly comparable to serum and plasma samples so they were not tested in this evaluation.

3. Clinical studies:

   a. Clinical Sensitivity:

   Not applicable

   b. Clinical specificity:

   Not applicable

   c. Other clinical supportive data (when a. and b. are not applicable):

   Not applicable

4. Clinical cut-off:

   Not applicable

5. Expected values/Reference range:

   The following table lists the reference ranges for this assay

Sample Type		Reference Range
Serum/Plasma	Adult:	74–106 mg/dL (4.1–5.9 mmol/L)
	Newborn 1 day:	40–60 mg/dL (2.2–3.3 mmol/L)
	Newborn > 1 day:	50–80 mg/dL (2.8–4.4 mmol/L)
	Child:	60–100 mg/dL (3.3–5.6 mmol/L)
Urine		< 0.5 g/day (2.78 mmol/day)
CSF	Adult:	40–70 mg/dL (2.2–3.9 mmol/L)
	Infant/Child:	60–80 mg/dL (3.3–4.4 mmol/L)

Wu AHB. *Tietz Clinical Guide to Laboratory Tests.* 4th ed. St. Louis, MO: WB Saunders Company; 2006:444–450.

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.